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the last chapter, they were completed by 1912. Those not made by myself were carried out by students who made their doctorates under my direction.

"The following chapters have been heretofore published in substance:"

- I. Sections III and IV. *American Journal of Mathematics*, vol. 33 (1911).
- II. *Astronomical Journal*, vol. 25 (1907).
- III. *Rendiconti Matematico di Palermo*, vol. 32 (1911).
- IV. *Transactions of the American Mathematical Society*, vol. 11 (1910).
- VII. *Mathematische Annalen*, vol. 73 (1913).
- VIII. *Annals of Mathematics*, second series, vol. 12 (1910).
- XI-XIV. *Transactions of the American Mathematical Society*, vols. 7 (1906), 13 (1912), 8 (1907), and 9 (1908) respectively.

XV. *Proceedings of the London Mathematical Society*, series 2, vol. 2 (1912).

"The investigations and computations contained in the last chapter were completed in 1917.

... Most of the computations on which many of the results of the last chapter are based were made by Dr. W. L. Hart and Dr. I. A. Barnett. Without assistance of such a high order the laborious computations could not have been carried out."

Contents: I: "Certain theorems on implicit functions and differential equations" (Moulton and Mac Millan), 1-54; II: "Elliptic motion," 55-66; III: "The spherical pendulum," 67-98; IV: "Periodic orbits about an oblate spheroid" (MacMillan), 99-150; V: "Oscillating satellites about the straight-line equilibrium points (first method)," 151-198; VI: "Oscillating satellites (second method)," 199-216; VII: "Oscillating satellites when the finite masses describe elliptic orbits," 217-284; VIII: "The straight-line solutions of the problem of n bodies," 285-298; IX: "Oscillating satellites near the Lagrangian equilateral triangle points" (Buck), 299-324; X: "Isosceles-triangle solutions of the problem of three bodies" (Buchanan), 325-356; XI: "Periodic orbits of infinitesimal satellites and inferior planets," 357-378; XII: "Periodic orbits of superior planets," 379-388; XIII: "A class of periodic orbits of a particle subject to the attraction of n spheres having prescribed motion" (Longley), 389-424; XIV: "Certain periodic orbits of k finite bodies revolving about a relatively large central mass" (Griffin), 425-456; XV: "Closed orbits of ejection and related periodic orbits," 457-484; XVI: "Synthesis of periodic orbits in the restricted problem of three bodies," 485-524.

Elementary Functions and Applications. By A. S. GALE and C. W. WATKEYS.

New York, Henry Holt and Company, 1920. 12mo. 20 + 436 pages.

Price \$2.60.

From the preface: "This book presents a coherent year's work in mathematics for college freshmen, consisting of a study of the elementary functions, algebraic and transcendental, and their applications to problems arising in various fields of knowledge. The treatment is confined to functions of one variable, with incidental exceptions, and complex values of the independent and dependent variables are excluded. The subject matter includes the essentials of plane trigonometry and topics from advanced algebra, analytic geometry, and calculus.

"The text is the result of experiments beginning in 1907-8. It has been used in the classroom since 1913-14, and each year extensive revisions have been made. Hence the content of the course, the order of topics, and the manner of presentation are based upon the experience of several years.

"The unity of the course is gained by an explicit analysis of the functions studied, which enables the student to comprehend the purpose of the course as a whole and the nature of the investigation of properties of functions of a given type. This analysis consists of three parts:

"First. Relations between a given function and its graph. . . . Most of these relations are considered in the first chapter so that at the start the student is made aware of a number of questions which will be investigated in studying a particular type of functions.

"Second. Relations between pairs of functions and their graphs. . . . These geometric transformations are introduced in connection with simple algebraic functions so that they are familiar tools by the time they are needed for the study of transcendental functions.

"Third. Analogous properties of functions which have no immediate graphical interpretation. Several properties of x^n are grouped together . . . in order to indicate further questions which should be investigated in studying transcendental functions.

"Emphasis is also placed on characteristic properties which distinguish one class of functions from another."

Contents—Chapter I: Functions, equations, and graphs, 1–45; II: Linear functions, 46–86; III: Algebraic functions, 87–157; IV: Trigonometric functions, 158–213; V: Exponential and logarithmic functions, 214–263; VI: Differentiation of algebraic functions, 264–300; VII: Integration, 301–331; VIII: Properties of trigonometric functions (Logarithmic solution of triangles, Cases III and IV), 332–364; IX: Theory of measurement [Statistical methods, permutations, combinations, the binomial expansion, probability, compound events, mortality tables, frequency distributions, averages, measures of variability, equation of the frequency curve representing a symmetrical distribution, the probable error, least squares, correlations], 365–432; Index, 433–436.

Análisis Matemático. Volumen 1: Las nociones fundamentales. By UGO BROGGI. (Publicaciones de la Facultad de Ciencias Físicas, Matemáticas y Astronómicas, Textos y conferencias no. 44.) La Plata, Imprenta y casa editora 'Coni,' Buenos Aires, 1919. Royal 8vo. 152 p. Price 6 pesos.

Part 1: Coördinates and tangents, 1–46; part 2: The notions of derivative and integral 47–90; part 3: Applications (Elementary methods of integration, definite integrals of geometry indeterminate expressions, integrals between infinite and improper limits, exercises), 91–148; alphabetical index, 149–152.

NOTES.

The first article (pages 33–37) of the second number of the second volume (1920) of *Norsk Mathematisk Tidsskrift* is a paper on "The main lines of H. G. Zeuthen's scientific productivity," read by Professor Heegard before the Norwegian Mathematical Society. It is accompanied by the reproduction of a recent portrait of Zeuthen.

In *The American Year Book, A Record of Events and Progress 1919* (New York, Appleton, 1920), the review of mathematics and astronomy, by G. A. Miller and R. S. Dugan respectively, occupied pages 607–614. The headings of Professor Miller's article (pages 607–608) are: "Teaching of mathematics," "Mathematical research," "History of mathematics," "Reference works."

Mathematics Teacher, in reorganized form, is to be the official organ of the National Council of Teachers of Mathematics (cf. 1920, 241). Mr. J. R. CLARK of the Lincoln School, New York, is to be the editor-in-chief and the first number is to be issued in January, 1921. There are to be eight numbers a year and the subscription price is \$2.00.

In *Archivio di Storia della Scienza*, volume 1, no. 3, published in May, 1920 (cf. 1919, 404; 1920, 217) Aldo Mieli continues his methodical bibliography (350 titles) of works on the history of science, 332–356. There is also a review by A. Mieli of two works published by the John Crerar Library, Chicago: *A List of Books on the History of Science, January, 1911* (Chicago, 1911); *Supplement, December, 1916* (Chicago, 1917), 361–363.

A new edition of Professor H. S. Carslaw's book *Introduction to the Theory of Fourier's Series and Integrals and the Mathematical Theory of the Conduction of Heat*, published in 1906 by Macmillan and Co., London, and now for some time out of print, is at present in the press. The book has been completely rewritten and will consist of two volumes. The first deals with "Infinite series and in-